Supporting Content Web Sites

BioEd Online-The Water Cycle and Global Warming
http://www.bioedonline.org/lessons/water-cycle.cfm
Students will explain the importance of the Water Cycle and will suggest ways humans interfere with the cycle.
B-6.5 and B-6.6

PBS-American Field Guide
http://www.pbs.org/americanfieldguide/teachers/forests/forests_sum.html
Students view videos on primary and secondary succession in various North American Forests. They will discover the progression of populations and the dynamics involved. A Teacher's Lesson Plan Guide is included.
B-6.3

US Environmental Protection Agency – "Climate Change-What You Can Do."
http://www.epa.gov/climatechange/wycd/calculator/ind_calculator.html
Use your household electric bill to calculate your contributions to greenhouse gas emissions.
B-6.6

A World of Diversity
http://library.thinkquest.org/C007506/cycles.html
Students view the roles of abiotic and biotic factors in the geochemical cycles through simulations.
B-6.4

Lecture 7 Mutualism: University of Connecticut
http://www.eeb.uconn.edu/Courses/EEB244/eeb244f00/Lec7web/
Students view slides containing pictures of mutualistic relationships and are given examples and graphs of different types of mutualism.
B-6.1

USGS-Status and Trends of the Nation's Biological Resources (Nonindigenous Species)
http://biology.usgs.gov/s+t/SNT/noframe/ns112.htm
Essential data given on competition between indigenous and nonindigenous species introduced in an area. It also explains the role of human activities in attributing to the competition.
B-6.1 and B-6.6

Predator-Prey Simulation
http://www.biologycorner.com/worksheets/predatorsim.html
Students will capture prey through 20 generations and plot data to show the relationship between predator and prey.
B-6.1

Teacher's Domain –"Ancient Farmers of the Amazon"
http://www.teachersdomain.org/resources/tdc02/sci/life/evo/leaf/index.html
Mutualism in leaf cutter ants of the Amazon is explored through a short video with accompanying discussion questions. The video is free but the user must register.
B-6.1

Limiting Factors/Evolution Game
http://www.accessexcellence.org/AE/AEPC/WWC/1995/limiting.html
A game where students evaluate different scenarios of limiting factors to determine if their population will survive. Copy of the game board and pieces are provided
B-6.2

Deer: Predation or Starvation
http://www.biologycorner.com/worksheets/deer_predation.html
Students plot data of a deer population after the introduction of wolves to an island forest reserve.
B-6.1 and B-6.2

Suggested Literature

Attenborough, D. (2005). *Life in the Undergrowth.* Princeton: Princeton University Press.
ISBN: 0691127034
Reading Level: 9-12
This book is a companion to a series on the Animal Planet Channel. Attenborough discusses the growth and development of insects and spiders from living in the sea to the air and then finally to land. He also explores the interrelationships among land invertebrates with their predators, preys, mates and rivals. Attenborough also evaluates insects such as bees, ants and termites and how the interrelationships among the organisms in an insect society prove to be beneficial.
B-6.1

Baskin, Y. (2005). *Under Ground: How Creatures of Mud and Dirt Shape Our World.* Washington, DC: Island Press.
ISBN: 1597260037
Reading Level: 9-12
In this book, Baskin discusses the role of underground organisms such as earthworms, fungi, slime molds and mud shrimp and how they contribute to the naturally occurring processes of generating soils, disposing of wastes, and recycling nutrients. She evaluates the roles of these creatures from the polar ice to the ocean floor and the ecosystems of rangelands, forests, pastures and wetlands. She discusses how the life of these underground creatures truly shapes the lives of what can live above ground. Baskin also explores how human activities such as air pollution, timber cutting, destruction of wetlands, and the introduction of invasive species are affecting the natural processes of the underground creatures. She then evaluates how that disruption will in turn affect the lives of all that inhabit above the ground.
B-6.5 and 6.6

Burdick, A. (2005). *Out of Eden: An Odyssey of Ecological Invasion.* New York: Farrar Straus & Giroux.
ISBN: 0374219737
Reading Level: 10.4
In this book, Burdick discusses how exotic plants and animals are being transported from their natural habitats (sometimes by unsuspecting humans) to areas of the world that they are not meant to inhabit. This shift causes these now "invasive species" to choke out those species that are native and sometimes endangered in those areas of the world. Burdick describes how these invasive species prove to be a limiting factor now to the growth of native populations.
B-6.2 and 6.6

Crump, M. (2000). *In Search Of The Golden Frog.* Chicago: University of Chicago Press.
ISBN:0226121984
Reading Level: 9-12
This book chronicles Dr. Crump's journey through Central and South America. In this journey, Crump explores the issue on human involvement in the decline of the amphibian population. She discusses how humans encroaching on the land and destroying the habitats of the amphibians are leading to the decline of the species diversity in that area.
B-6.6

Kovach, R. (2004). *Firefly Guide To Global Hazards.* Ontario: Firefly Books
ISBN: 155297815X
Reading Level: 9-12
This guide outlines natural disasters and their effects on humans. It also explains hazards caused by overpopulation including the biological effects of diseases and explores the effects of pollution.
B-6.2

Owens, M. (2006). *Secrets of the Savanna: Twenty-Three Years In The African Wilderness Unravelling the Mysteries of Elephants and People* Boston: Houghton Mifflin Company
ISBN: 0395893100
Reading Level: 9-12
This book details the struggles of an African Village where poachers have destroyed the elephant population. A couple chronicles their work to save the population, and they share their insight on the influence of population numbers on social behaviors.
B-6.1 and 6.6

Pimm, S. (2001). *World According To Pimm: A Scientist Audits The Earth.* Columbus: McGraw-Hill Book Company
ISBN: 0071374906
Reading Level: 9-12
This book examines the impact of human actions on biodiversity and extinction rates. It also warns readers of how rapidly humans are depleting our natural resources and the consequences of those actions.
B-6.6

Shaw, Jane. (2002) *Global Warming.* Farmington Hills: Greenhaven Press
ISBN: 0737712708
Reading Level: 7-12
This book addresses the issue of global warming and its possible effects on the geochemical (Water and Carbon) cycles of the Earth. The causes of global warming and the effects of greenhouse gases on the temperature of the Earth are explored. Shaw evaluates how serious a threat global warming is to the Earth and provides evidence of what is contributing to the global warming issue. Shaw also gives suggestions to what could be done to stop global warming.
B-6.4 and 6.6

Walker, P. (2005). *People And The Sea.* New York: Facts on File
ISBN: 0816057060
Reading Level: 8.9
This book explains some food chains of the oceans and an overview of its biodiversity. Its main focus is on the effects of pollution, over-fishing and global warming on aquatic life.
B-6.6

Wallace, L. (2004). *After the Fires: The Ecology Of Change In Yellowstone National Park.* New Haven: Yale University Press
ISBN: 0300100485
Reading Level: 11-12
This book provides detail of the fires in Yellowstone National Park in 1988 and the effects of the fire on various ecological levels. The book gives detail of the chronology of the fire as well as the effects of the fire on individuals and species living there. Attention is also given to the aquatic (food webs and water yield) and terrestrial (landscape) ecosystems in the area. The stages of succession after the fires are explored and Yellowstone is described as a resilient ecosystem.
B-6.3

Suggested ETV Streamline SC or ITV Video Resources

Biology: The Science of Life: Ecosystems: The Role of Abiotic Factors
United Streaming: www.unitedstreaming.com
The role of the abiotic limiting factors of water, air, soil, heat and light are explored in this video. The negative impacts of man's actions are also included. In addition, the nitrogen, water, and carbon cycles are explained.
15:00
B-6.2, B-6.4, and B-6.6

Life Science: Ecology
"The Galapagos Islands"
United Streaming: www.unitedstreaming.com
This video shows the unique species living on the Galapagos Islands and how introduced species are endangering the ecosystem. It explains that humans introduced these species and have caused pollution and trash to invade these once isolated islands.
3:45
B-6.6

Life Science : Ecology
"The Food Chain: Predators and Prey"
United Streaming: www.unitedstreaming.com
This video explains the different strategies among predators as well as the types of competition that exist among them.
2:40
B-6.1

The Cycle Series: The Water Cycle
"Where Does Fresh Water Come From?"
United Streaming: www.unitedstreaming.com
The water cycle is explained step by step with interesting video footage. This video also explains why most of the water on the earth is unusable to humans and the importance of recycling.
6:29
B-6.4

Where Have All The Animals Gone: Endangered Species
"Human Impact on Extinction', "Habitat Destruction", and "Overhunting and Poaching"
United Streaming: www.unitedstreaming.com
The importance of the Rainforest is explained as well as why it is disappearing rapidly. The reasons humans overhunt is also given and the history of the American Buffalo is used to explain how overhunting can cause a species to become endangered.
6:11
B-6.6

Elements of Biology: Ecosystems: Organisms and Their Environment
"Types of Interactions Within Ecosystems"
United Streaming: www.unitedstreaming.com
Competition between animal and plant populations is explained. Predation and prey relationships are explained, and types of symbiotic relationships are explained with actual video of the examples
4:35
B-6.1

Elements of Biology: Ecosystems: Organisms and Their Environment
"Chemical Cycles"
United Streaming: www.unitedstreaming.com
The water and carbon cycles are explained. The elements nitrogen and phosphorus are mentioned as recyclable and the effects of overproduction of these are explained.
2:40
B-6.4

Biologix: Succession and Climax Communities
United Streaming: www.unitedstreaming.com
This video consists of 14 segments, which may be used together or alone. "Stages of Succession" can be used alone. The entire video gathers data from a community and analyzes the changes that occur within this community.
29:07
B-6.3

Biologix: Interactions and Relationships Among Organisms
"Predation" and "Symbiosis"
United Streaming: www.unitedstreaming.com
A simulation of predation is shown with students gathering candy. Defensive adaptations in plants and mimicry in some animals are also explained. Examples of hare, reindeer, and elk are used to show how predators control populations.
8:35
B-6.1

Biologix: Interactions and Relationships Among Organisms
"Symbiosis"
United Streaming: www.unitedstreaming.com
Parasitism, mutualism and commensalism are the symbiotic relationships explained in this segment. The life cycle of the elk fluke is given for parasitism plus some human parasites and various examples of mutualism are explained including *E. coli* and humans. Commensalism examples include epiphytes and the segment ends with a good summary showing the three relationships with positive or negative signs for the type of relationship.
7:15
B-6.1

Note: The Enviro-Tacklebox Modules in United Streaming address many environmental issues. Because these are so lengthy, you may assign these to students to view at home or use in the classroom if you have time.

Career Connections

Wildlife Biologist/Researcher
Wildlife Biologists use research and analytical skills to study interrelationships among organisms and their environment. Much of their research occurs outdoors where they study population data and infer what factors are influencing the species in their area. A wildlife biologist will also explain how populations are affected by limiting factors. They will recommend best ways to control or manage a population.
B-6.1 and B-6.2

Fisheries Biologist
A Fisheries Biologist monitors the quality of streams, rivers, and lakes and evaluates the populations living there. They look for damages caused by pollutants from the general public or from major accidents such as oil spills. They also assess how these pollutants can limit the populations inhabiting the water. A fisheries biologist will also patrol the waters to ensure inhabitants are not being endangered or that the water is not being overused.
B-6.2 and B-6.6

Recycling Coordinator
A recycling coordinator must be knowledgeable of recycling laws and trends. They work closely among communities to educate the community members on what types of materials can be recycled and to gain participation from the community in the recycling program. A recycling coordinator will also work side by side with local government officials to push for recycling legislation.
B-6.5

Air Quality Inspector
An Air Quality Inspector's main role is to monitor, protect, and regulate the quality of the air we breathe. The inspector will write permits for factories that emit pollutants into the air, and he or she will then visit these factories to monitor their emissions to ensure they are complying with pollution laws. New factories will also call on air quality inspectors before beginning operations to ensure they pose no risk to the environment. After chemical explosions or gas leaks, inspectors will come in to assess possible damage to the air quality.
B-6.6

Environmental Attorney
Environmental Attorneys work hard to fight for the protection of the physical and chemical cycles of the Earth against human activities. Some aspects of the Earth that they lobby and fight for include pollution free air, the preservation of endangered species and clean water. Environmental attorneys combine a strong legal foundation with a firm science knowledge to negotiate environmental laws between factories, government agencies and environmental groups. Environmental attorneys must be very passionate and committed to the cause of conserving and protecting the environment.
B-6.6